

Abstract Title Page

Title: Impacts of Study Abroad on American Students' Intercultural Competence- A Propensity Score Analysis

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Abstract Body

Background / Context:

American higher education has experienced a growing trend of globalization and internationalization during the past two decades. According to the Open Doors Report on International Educational Exchange, 260,327 students studied abroad for credit during academic year 2008-09, compared to fewer than 100,000 in 1996/1997 (Institute of International Education, 2010). A study abroad program is a summer, semester, or yearlong academic and/or practical experience overseas to enhance the participant's formal education. The quality of and investment in study abroad programs are considered as an important indicator of overall institutional competitiveness. An institution that offers high-quality study abroad programs is perceived as likely to provide a stimulating learning environment for the students (Stroud, 2010). However, there are very few well-designed evaluation studies that provide evidence about the types of impacts of study abroad programs on students' academic and non-academic outcomes. To fill this void in the literature, the present study aims to estimate, from an institutional perspective, the effect of study abroad experience on students' social, behavioral, and attitudinal outcomes with an emphasis on students' intercultural competence and adaptability using survey data of 1,330 college students who entered a northeastern mid-size comprehensive private university in the fall of 2006. The authors used propensity score matching to match treatment and comparison students on a wide range of baseline covariates so that the derived estimates of impacts would be as least biased as possible.

Purpose / Objective / Research Question / Focus of Study:

The Commission on the Abraham Lincoln Study Abroad Fellowship Program (2005) states that "moving overseas to study does not produce experts but it does begin a process of inculcating awareness of international and intercultural issues, a process that, multiplied many millions times over, promises to vastly increase American global literacy." The hypotheses of the present study were guided by this statement. The author hypothesized that the study abroad experience is positively associated with habits of mind (e.g., critical thinking skills, problem-solving skills), social self-concept (e.g., tolerance of others with different beliefs, openness to having own views challenged), and civic-awareness (e.g., understanding of social problems facing the community, the nation and the world). The association of study abroad experience with students' academic outcome is possible, but is not of main interest of this study.

Setting:

A mid-size comprehensive private university located in the Northeastern United States.

Population / Participants / Subjects:

The present study draws on the data of 1,004 college students' responses to the Fall 2006 Freshman Survey and Spring 2010 College Senior Survey, both of which were instruments developed by the Cooperative Institutional Research Program (CIRP) at UCLA. The CIRP Freshman Survey provides information about incoming students' backgrounds, academic and

career expectations, personal goals, and opinions on a wide range of political and social issues. The College Senior Survey collects data on the students' academic, civic, and diversity outcomes and post-college goals and plans.

Table 1 lists the baseline survey items that reflect the students' background information in the fall of 2006. The author merged the baseline survey data with the 2009-2010 College Senior Survey data, which resulted in an analytic sample of 1,004 students, including 361 study-abroad students and 643 non-study-abroad students. While no one variable was missing more than 10% of the data, in combination, listwise deletion ended getting rid of more than a third of the 1,004 cases. To prevent the huge loss of statistical power, multiple imputations were conducted to replace all missing values on each variable with multiple plausible values sampled from the prediction distribution of a regression model based on the observed data (Allison, 2001).

(please insert Table 1 here)

Intervention / Program / Practice:

The program or treatment variable in this study is the study abroad program that about one-third of the student sample participated in during their undergraduate years. The treatment group consists of the 361 students who studied abroad while the comparison group consists of those who did not have any study-abroad experience.

Research Design:

Although the experimental design is considered as the most rigorous and robust method for program evaluation, it is infeasible and unethical for this study because one cannot randomly assign some students to treatment and comparison groups thereby providing potential benefits of the program to some students deprive learning opportunities of others. Therefore, the author turns to the non-equivalent comparison group design that forms treatment and comparison groups via matching. Matching is a method of sampling from a large pool of potential control units where the objective is to select a subset of the control units with covariate values similar to those in the treated group (Cook & Campbell, 1979). One can attempt to match on all covariates, but this may be difficult to implement when the set of covariates is large (Cochran & Rubin, 1973). In order to reduce the dimensionality of matching, Rosenbaum and Rubin (1983) proposed an innovative matching technique that is based on the propensity score $p(X)$. This is defined as a single subject's probability of receiving treatment given the covariate values X and thus a scalar function of X .

In this study, the author attempted to match students from the two groups based on their baseline characteristics and hence reduce the selection biases due to their observed potential confounders. The author used the absolute value of the standardized difference in means between treatment and control groups introduced by Rosenbaum and Rubin (1983) to examine bias reduction before and after matching. According to Rosenbaum and Rubin (1983), there is covariate imbalance and matching is required if the absolute standardized difference is greater than 10. Following a strategy suggested by Rosenbaum and Rubin (1984), the author built a propensity score model using stepwise logistic regression with the selected covariates. The

optimal matching is superior to greedy matching in that it tends to minimize the average absolute propensity score differences between the matched pairs and hence make the optimal global decision (Gu & Rosenbaum, 1993).

Data Collection and Analysis:

Table 2 shows the means and standard deviations of the covariates for the two groups before matching.

(please insert Table 2 here)

Table 3 shows the results of balance improvement on the covariates after the optimal propensity score matching was conducted. The matching resulted in a subset of 361 control students who matched closely with the 361 study-abroad students. As shown in Table 3, the average standardized difference for all covariates was reduced from 17.90 to 5.63. Additionally, the number of covariates whose standardized difference is above 10 has been reduced from 18 to 6 as a result of the matching.

(please insert Table 3 here)

It is noteworthy that 217 out of the 361 treatment students participated in the study abroad program for at least one fall or spring semester. The rest 144 treatment students only participated in the summer study abroad program, which is considered substantially different from the fall/spring program. Therefore, we also conducted a propensity score matching for the 217 fall/spring study-abroad students versus the 643 potential control students. Table 4 shows the comparison of means and standard deviations of spring/fall study-abroad group versus non-study-abroad group before propensity score matching. Table 5 presents the means and standard deviations of study-abroad group versus non-study-abroad group after propensity score matching, which selected a subset of non-study-abroad students (N= 217) who matched with the treatment group. As shown by Table 4 and 5, the average standardized difference for all covariates was reduced from 19.62 to 5.82. Additionally, the number of covariates whose standardized difference is above 10 has been reduced from 17 to 6 as a result of the matching.

(please insert Table 4 here)

(please insert Table 5 here)

Stepwise multiple regression analyses were conducted using the matched data to investigate whether study abroad experience was associated with students' academic, civic, and behavioral outcomes after controlling for baseline individual and institutional characteristics. All the independent variables that were retained in the multiple regression model have to meet the .15 significance level. The outcome variables are the CIRP College Senior Survey constructs that capture the students' curricular and extra-curricular experiences and outcomes. The CIRP staff created these constructs by combining individual items using the Item Response Theory (IRT). For example, the construct *Social Agency* measures the extent to which students value political and social involvement as a personal goal. This construct is comprised of six items that assess the extent to which one engages in a community action program, helping to promote racial

understanding, becoming a community leader, influencing social values, keeping up to date with political affairs, and helping others who are in difficulty.

Findings / Results:

The results of post-matching multiple regression analysis show that, after controlling for baseline student characteristics, out of all the outcome constructs, study abroad in general (including the summer programs) is positively associated with change in habits of mind ($p < .001$) (e.g., critical thinking skills, problem-solving skills), social self-concept ($p < .01$) (e.g., tolerance of others with different beliefs, openness to having own views challenged), civic-awareness ($p < .05$) (e.g., understanding of social problems facing the community, the nation and the world), social-agency ($p < .01$) (e.g., participating in a community action program, helping to promote racial understanding).

Conclusions:

This study not only advances the understanding of the nature of impacts of study abroad programs, but also addresses the need for innovative methods to address the selection bias, i.e., individual and institutional factors that influence students' intent to participate in the programs. Results from this study have important implications and show that the study abroad experience does have a positive impact on habits of mind, social self-concept, civic-awareness, and social-agency involvement, but no impacts on academic outcomes. The results confirmed the statement made by the Commission on the Abraham Lincoln Study Abroad Fellowship Program. In the full paper, the author will further explore if the duration of the programs moderate the impacts on students by looking at the impacts on the summer program participants and full-semester program participants.

Appendices

Appendix A. References

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Appendix B. Tables and Figures

Table 1. The list of covariates chosen for the propensity score matching.

Variable Name	Label
SATV	SAT Verbal
SATM	SAT Math
female	Gender (1= Female, 0= Male)
white	White
hispanic	Hispanic
black	Black
income	Household income
engine	Engineering major
science	Science major
social	Social science or humanities major
health	Health related major
acaself	TFS academic self-concept composite score
socself	TFS social self-concept composite score
soagen	TFS social agency composite score
colrep	TFS college reputation orientation composite score
colinv	TFS likelihood of college involvement composite score
fstgen	First generation college student
fedu	Father's education (from 1 to 8; 1= grammar school, 8= graduate school)
medu	Mother's education (from 1 to 8; 1= grammar school, 8= graduate school)
catholic	Catholic or not
norelig	No religion
fincon	Concern about ability to finance education (3= Most, 2= Some, 1= None)
whiteness	Proportion of white students in high school (5= completely white, 1= completely non-white)
ap	Number of AP courses taken in high school
citizen	U.S. citizen or not
depend	Number of dependents on parents for financial support
hsgpa	High school GPA

Table 2. The comparison of means and standard deviations of study-abroad group versus non-study-abroad group before propensity score matching.

Pre-Match	Treatment (N= 361)		Comparison (N= 643)		Standardized	Absolute
Covariates	Mean T	SD T	Mean C	SD C	Difference	SD
SATV	632.79	68.17	614.08	68.34	27.42	27.42
SATM	657.52	63.95	650.09	67.97	11.26	11.26
female	0.64	0.48	0.46	0.50	37.30	37.30
white	0.89	0.31	0.84	0.37	14.45	14.45
hispanic	0.07	0.25	0.07	0.26	-3.19	3.19
black	0.01	0.12	0.06	0.24	-26.04	26.04
income	165029.82	77158.38	147883.78	78635.80	22.01	22.01
engine	0.06	0.24	0.21	0.41	-43.13	43.13
science	0.08	0.27	0.13	0.33	-16.05	16.05
social	0.37	0.48	0.22	0.42	31.80	31.80
health	0.02	0.13	0.08	0.27	-30.15	30.15
acaself	52.61	6.77	52.58	7.11	0.43	0.43
socself	50.20	9.07	49.76	8.91	4.86	4.86
soagen	49.07	7.98	47.80	8.50	15.48	15.48
colrep	51.61	6.28	51.51	6.41	1.58	1.58
colinv	50.15	6.49	46.75	6.90	50.70	50.70
fstgen	0.03	0.16	0.08	0.27	-21.97	21.97
fedu	6.49	1.50	6.15	1.68	21.23	21.23
medu	6.23	1.44	5.87	1.61	23.32	23.32
catholic	0.70	0.46	0.71	0.45	-1.83	1.83
norelig	0.08	0.28	0.07	0.26	3.73	3.73
fincon	1.51	0.60	1.55	0.64	-6.12	6.12
whiteness	3.81	0.80	3.72	1.01	10.15	10.15
ap	3.52	2.68	2.88	2.46	24.71	24.71
citizen	0.99	0.10	0.98	0.15	9.42	9.42
depend	3.64	1.42	3.58	1.52	4.47	4.47
hsgpa	3.61	0.42	3.52	0.49	20.44	20.44
					Average	17.90

$$\text{*standardized difference} = \frac{100(\bar{x}_{treated} - \bar{x}_{control})}{\sqrt{\frac{s_{treated}^2 + s_{control}^2}{2}}}$$

Table 3. The comparison of means and standard deviations of study-abroad group versus non-study-abroad group after propensity score matching, which selected a subset of non-study-abroad students (N= 361) who matched with the treatment group.

Post-match	Treatment (N= 361)		Comparison (N= 361)		Standardized	Absolute
Covariates	Mean_T	SD_T	Mean_C	SD_C	Difference	SD
SATV	632.79	68.17	624.48	67.25	12.28	12.28
SATM	657.52	63.95	654.92	65.07	4.04	4.04
female	0.64	0.48	0.55	0.50	19.23	19.23
white	0.89	0.31	0.87	0.33	5.13	5.13
hispanic	0.07	0.25	0.07	0.25	0.00	0.00
black	0.01	0.12	0.02	0.15	-6.24	6.24
income	165029.82	77158.38	161901.96	80599.29	3.96	3.96
engine	0.06	0.24	0.09	0.29	-10.36	10.36
science	0.08	0.27	0.11	0.31	-11.38	11.38
social	0.37	0.48	0.31	0.46	11.12	11.12
health	0.02	0.13	0.02	0.13	0.00	0.00
acaself	52.61	6.77	52.46	6.95	2.07	2.07
socself	50.20	9.07	50.17	8.86	0.28	0.28
soagen	49.07	7.98	48.94	7.95	1.74	1.74
colrep	51.61	6.28	51.64	6.30	-0.47	0.47
colinv	50.15	6.49	48.65	6.05	23.96	23.96
fstgen	0.03	0.16	0.04	0.19	-4.73	4.73
fedu	6.49	1.50	6.40	1.56	5.79	5.79
medu	6.23	1.44	6.14	1.47	6.20	6.20
catholic	0.70	0.46	0.71	0.46	-1.21	1.21
norelig	0.08	0.28	0.07	0.26	3.08	3.08
fincon	1.51	0.60	1.52	0.64	-2.24	2.24
whiteness	3.81	0.80	3.79	0.94	3.17	3.17
ap	3.52	2.68	3.27	2.62	9.51	9.51
citizen	0.99	0.10	0.99	0.10	0.00	0.00
depend	3.64	1.42	3.63	1.45	0.77	0.77
hsgpa	3.61	0.42	3.60	0.46	3.13	3.13
					Average	5.63

Table 4. The comparison of means and standard deviations of fall/spring study-abroad group versus non-study-abroad group before propensity score matching.

Pre-Match	Treatment (N= 217)		Comparison (N= 643)			
Covariates	Mean T	SD T	Mean C	SD C	Standardized Difference	Absolute SD
SATV	635.63	71.91	614.08	68.34	30.72	30.72
SATM	656.31	66.97	650.09	67.97	9.21	9.21
female	0.65	0.48	0.46	0.50	40.42	40.42
white	0.85	0.36	0.84	0.37	3.52	3.52
hispanic	0.08	0.27	0.07	0.26	1.39	1.39
black	0.02	0.15	0.06	0.24	-20.06	20.06
income	155818.11	78924.12	147883.78	78635.80	10.07	10.07
engine	0.04	0.19	0.21	0.41	-54.12	54.12
science	0.05	0.21	0.13	0.33	-28.75	28.75
social	0.43	0.50	0.22	0.42	46.00	46.00
health	0.00	0.00	0.08	0.27	-41.92	41.92
acaself	52.33	6.69	52.58	7.11	-3.55	3.55
socself	49.88	8.63	49.76	8.91	1.34	1.34
soagen	49.59	8.16	47.80	8.50	21.57	21.57
colrep	51.30	6.38	51.51	6.41	-3.24	3.24
colinv	50.89	6.71	46.75	6.90	60.72	60.72
fstgen	0.03	0.18	0.08	0.27	-19.47	19.47
fedu	6.45	1.53	6.15	1.68	18.61	18.61
medu	6.20	1.40	5.87	1.61	22.00	22.00
catholic	0.66	0.48	0.71	0.45	-10.79	10.79
norelig	0.10	0.30	0.07	0.26	10.02	10.02
fincon	1.54	0.61	1.55	0.64	-0.59	0.59
whiteness	3.81	0.77	3.72	1.01	9.94	9.94
ap	3.74	2.69	2.88	2.46	33.27	33.27
citizen	0.98	0.13	0.98	0.15	3.42	3.42
depend	3.62	1.46	3.58	1.52	2.72	2.72
hsgpa	3.62	0.42	3.52	0.49	22.32	22.32
					Average	19.62

Table 5. The comparison of means and standard deviations of fall/spring study-abroad group versus non-study-abroad group after propensity score matching.

Post-match	Treatment (N= 217)		Comparison (N= 217)		Standardized	
Covariates	Mean T	SD T	Mean C	SD C	Difference	Absolute SD
SATV	635.63	71.91	625.76	69.94	13.92	13.92
SATM	656.31	66.97	648.15	64.65	12.40	12.40
female	0.65	0.48	0.61	0.49	8.60	8.60
white	0.85	0.36	0.84	0.37	3.82	3.82
hispanic	0.08	0.27	0.09	0.29	-4.94	4.94
black	0.02	0.15	0.04	0.20	-10.42	10.42
income	155818.11	78924.12	151799.63	80575.70	5.04	5.04
engine	0.04	0.19	0.04	0.20	-2.37	2.37
science	0.05	0.21	0.04	0.20	2.25	2.25
social	0.43	0.50	0.41	0.49	4.66	4.66
health	0.00	0.00	0.00	0.00	0.00	0.00
acaself	52.33	6.69	52.19	6.89	2.11	2.11
socself	49.88	8.63	50.69	9.19	-9.06	9.06
soagen	49.59	8.16	49.83	7.95	-2.99	2.99
colrep	51.30	6.38	51.51	6.67	-3.29	3.29
colinv	50.89	6.71	50.16	6.28	11.22	11.22
fstgen	0.03	0.18	0.05	0.21	-7.11	7.11
fedu	6.45	1.53	6.29	1.54	10.82	10.82
medu	6.20	1.40	6.11	1.49	6.21	6.21
catholic	0.66	0.48	0.67	0.47	-1.95	1.95
norelig	0.10	0.30	0.09	0.28	4.72	4.72
fincon	1.54	0.61	1.57	0.67	-4.32	4.32
whiteness	3.81	0.77	3.80	0.89	1.66	1.66
ap	3.74	2.69	3.72	2.84	0.67	0.67
citizen	0.98	0.13	0.99	0.12	-3.65	3.65
depend	3.62	1.46	3.55	1.42	4.49	4.49
hsgpa	3.62	0.42	3.55	0.48	14.34	14.34
					Average	5.82